



# The Columbia River Corridor

*Restore the River Corridor - Transition the Central Plateau - Prepare for the Future*



*C Reactor before and after cocooning*



*DR Reactor before and after cocooning*



*F Reactor before and after cocooning*



*H Reactor after cocooning process*



*The Hanford Reach of the Columbia River*

## Background

Hanford's Columbia River Corridor stretches out over about 210 square miles. The corridor is home to nine former plutonium production reactors, including the B Reactor, the world's first full-scale nuclear production reactor. B Reactor produced the plutonium for the bomb that ended World War II. The River Corridor also includes fuel fabrication, research, and support facilities.

Reactor operations for plutonium production between 1943 and 1989 resulted in hundreds of waste sites, burial grounds, and excess facilities. These still exist today and are in need of cleanup, excavation, and/or demolition.

## Scope and Projects

### Reactor Cocooning

The last of Hanford's nine reactors was shut down in 1989. Plans today call for eight of the nine to be put into interim safe storage, or "cocooned" (the historic B Reactor may be preserved as a museum). Cocooning involves demolishing all but the shield walls surrounding the reactor core – more than 85 percent of the reactor complex – and putting a 75-year roof on the remaining structure. Cocooning basically eliminates the need for surveillance and maintenance, and provides a safe condition to allow the reactors' radioactivity to be reduced through natural decay – without exposing workers. Today, cocooning is complete on five Hanford reactors. C Reactor was finished in 1998,

DR in 2002, F and D in 2004, and H in 2005. K East and K West Reactors will be completed in 2011, and N Reactor in 2012.

### Waste Site Cleanup

The River Corridor contains 761 waste sites and burial grounds, the majority of which surround the nine reactor areas along the Columbia River. Each of the reactor sites contains landfills, liquid waste disposal ponds, areas contaminated by operational leaks and accidents, and waste sites where contaminated and uncontaminated wastes were buried. Buried materials include chemically and radioactively contaminated

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materials such as asbestos, lead, chromium, carbon tetrachloride, strontium, uranium, cesium, and tritium.

The contaminated soil and/or debris, once it has been dug up or removed from demolition sites, is moved away from the Columbia River and placed in the Environmental Restoration Disposal Facility (ERDF). This lined disposal site is located on the Central Plateau near the center of the Hanford Site. Since this work began in 1996, workers have moved more than 6.5 million tons of contaminated material – substantially more than would fit into the Empire State Building. About 3,000 tons of contaminated soil and materials go into the ERDF each day. Eventually, this facility is expected to hold about 10 million tons of this low-level waste from cleanup. Once filled, the ERDF will be capped with an engineered barrier to prevent the release of waste and the infiltration of rain.

## Spent Fuel Removal

Hanford's "spent" nuclear fuel had been irradiated in a reactor as part of the plutonium production process. When reprocessing operations ceased in the late 1980s, Hanford was left with about 2,300 tons of spent nuclear fuel in the K East and K West Reactor Basins. This fuel represents about 80 percent of the U.S. Department of Energy's (DOE's) nationwide inventory.

In December 2000, Hanford workers began moving the fuel out of the K West Basin and into dry, long-term safe storage at the Canister Storage Building near the center of the Hanford Site, far from the Columbia River. Five years later, more than 2,100 tons of fuel have been moved – representing all of the K West Basin and K East Basin inventory. Now efforts are being focused on removing the sludge from the bottoms of the K East and K West Basins. Eventually, all of Hanford's spent nuclear fuel will be disposed of in a national repository.

## 300 Area Cleanup

For nearly 60 years, the 300 Area, located just 1.5 miles north of the City of Richland and along the west bank of the Columbia River, was the center of Hanford's radiological research and fuel fabrication. Research and fabrication resulted in highly contaminated facilities and waste sites, and a large inventory of radioactive materials. Key 300 Area cleanup progress includes:

- About 12 million curies of radioactivity have been removed from the 324 Building, which was used for chemical and

metallurgical research on radioactive materials and processes for 30 years. Inside this building is B Cell, a concrete shielded room where chemical processes used radioactive material. Due to the high radiation levels in the cell, cleanout operations were conducted using remotely handled manipulators with workers looking through four-foot thick shield windows or viewing through in-cell cameras. Radioactive debris containing about 3 million curies of radioactivity has been safely removed from the B Cell. This, combined with other shipments of radioactive materials, has reduced the overall 324 Building inventory to less than 200,000 curies.

- Nearly two metric tons of commercial spent nuclear fuel had been held for laboratory experiments. On October 2, 2002, the last of these fuel assemblies was safely transported out of the facility in lead-shielded, 18-foot casks and placed in safe interim storage on Hanford's Central Plateau. The casks will stay in interim storage until they can be permanently disposed of in a national repository.
- About 900 metric tons of leftover uranium from N Reactor fuel fabrication have been safely shipped off the Hanford Site, and another 140 metric tons of uranium "scrap" and other materials have been disposed of onsite. Uranium dioxide crystals have also been removed from the 300 Area and sent to the Oak Ridge National Laboratory in Tennessee.
- About 1,500 55-gallon drums of waste were discovered in the 618-4 Burial Ground during an excavation operation in 1998. Workers have dug up and removed the barrels – some of which contain depleted uranium shavings in oil or uranium oxide powder.

## Accelerated Cleanup

With the exception of two burial grounds requiring the deployment of new technologies (618-10 and 618-11), and the ongoing remediation of groundwater, DOE intends to complete cleanup of the Columbia River Corridor as early as 2015. Although there will be some continuing degree of engineering and institutional controls on the use of groundwater, most of the corridor either is or will be eligible to be included in the Hanford Reach National Monument and the 300 Area will be available for industrial use. Completing cleanup of the Columbia River Corridor will shrink the footprint of active cleanup operations by 210 square miles. DOE resources and energy will then be focused on accelerating risk reduction in the Central Plateau.

For more  
information



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